WE CLAIM:

1. A semiconductor diode with hydrogen detection capability, comprising:

a semiconductor substrate;

a doped semiconductor active layer formed on said substrate and made from a compound having the formula XYZ, in which X is a Group III element, Y is another Group III element different from X, and Z is a Group V element;

a semiconductor contact-enhancing layer formed on said active layer and made from a compound having the formula MN, in which M is a Group III element, and N is a Group V element;

an ohmic contact layer formed on said semiconductor contact-enhancing layer and extending through said semiconductor contact-enhancing layer and into said active layer; and

a Schottky barrier contact layer formed on said active layer so as to provide a Schottky barrier therebetween, said Schottky barrier contact layer being made from a metal that is capable of dissociating a hydrogen molecule into hydrogen atoms.

2. The semiconductor diode of Claim 1, wherein said semiconductor contact-enhancing layer is made from n-GaAs.

3. The semiconductor diode of Claim 2, wherein said semiconductor contact-enhancing layer has a dopant

concentration ranging from $1x10^{17}$ to $1x10^{19}$ atoms/cm^3.

4. The semiconductor diode of Claim 3, wherein said semiconductor contact-enhancing layer has a thickness ranging from 100 to 3000Å.

5. The semiconductor diode of Claim 1, further comprising an oxide layer sandwiched between said active layer and said Schottky barrier contact layer.

6. The semiconductor diode of Claim 5, wherein said oxide layer is made from a compound selected from the group consisting of silicone dioxide, titanium didoxide, and zinc oxide.

7. The semiconductor diode of Claim 5, wherein said oxide layer has a thickness ranging from 20 to 500 Å.

8. The semiconductor diode of Claim 1, wherein said compound of said active layer is selected from the group consisting of n-type InGaP and $Al_xGa_{1-x}As$.

9. The semiconductor diode of Claim 8, wherein said compound of said active layer is n-type $In_{0.49}Ga_{0.51}P$ with a dopant concentration ranging from $1x10^{15}$ to $5x10^{18}$ atoms/cm^3, said active layer having a thickness ranging from 1000 to 5000Å.

10. The semiconductor diode of Claim 8, wherein said compound of said active layer is $Al_xGa_{1-x}As$ with x=0-1 and a dopant concentration ranging from $1x10^{15}$ to $5x10^{18}$ atoms/cm^3, said active layer having a thickness ranging from 1000 to 5000Å.

11. The semiconductor diode of Claim 1, further

comprising a semiconductor buffer layer sandwiched between said substrate and said active layer.

12. The semiconductor diode of Claim 11, wherein said buffer layer is made from undoped GaAs and has a thickness ranging from 1000 to 50000 Å.

13. The semiconductor diode of Claim 1, wherein said substrate is made from semi-insulating GaAs.

14. The semiconductor diode of Claim 1, wherein said ohmic contact layer is made from AuGe/Ni and has a thickness ranging from 1000 to 50000Å.

15. The semiconductor diode of Claim 1, wherein said ohmic contact layer is made from AuGe and has a thickness ranging from 1000 to 50000Å.

16. The semiconductor diode of Claim 1, wherein said metal of said Schottky barrier contact layer is selected from the group consisting of Pt, Pd, Ni, Rh, Ru, and Ir.

17. The semiconductor diode of Claim 1, wherein said Schottky barrier contact layer has a thickness ranging from 100 to 20000Å.